Operating Instructions

BRINKMANN Immersion Pumps

TS12…24

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Brinkmann Immersions Pumps of the Series TS12 ... 24

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1 Indication to the manual

This operating manual gives basic instructions which are to be observed during installation, operation and maintenance of the pump. It is therefore imperative that this manual be read by the responsible personnel and operator prior to assembly and commissioning. It is always to be kept available at the installation site.

1.1 Identification of safety instructions in the operating manual

Safety instructions given in this manual non-compliance with which would affect **safety** are identified by the following symbol

Safety sign according with ISO 3864 – B.3.1

or where **electrical safety** is involved, with:

Safety sign according with ISO 3864 – B.3.6

Where non-compliance with the safety instructions may cause a risk to the machine and it's function the word

ATTENTION

is inserted.

2 Description of the Product

2.1 General description of the pump

Pumps of this type are one and two-stage centrifugal pumps where the impeller is fixed on the driving shaft extension. The TS pumps are fitted out with impellers open on both sides to gain relative high pressure with compact dimension of the pump unit. The pumps should be protected against coarser impurities in the coolants. Pump and motor form a compact and space-saving unit.

Vertically mounted pumps are equipped with a mounting flange. The pump end immerses into the tank and the motor extends vertically above the tank.

2.2 Intended use

The immersion pumps of the series TS are suitable for CNC machine tools featuring coolant supply through the tool holder or driving spindle or equipped with internally cooled tool within the limiting application in accordance with table 1. Series TS are suitable for filtered coolant only.

Limit of Application (Table 1)

Type	TS12...15	TS21…24
Mediums	Coolant, cooling- and cutting-oils	
Kinetic viscosity of the medium	…200 SSU *(...45 mm^2/s)*	
Temperature of medium	30 … 175 °F *(0 ... 80 °C)* (.... 300°F *(.... 150 °C)* as special make)	
Particle-size in the medium	0.08 Inch *(2 mm)* TS12…15 0.12 Inch *(3 mm)* TS21…24	
min. delivery volume	1% of Q max.	
Dry running	The pumps are not suitable for dry running.	
Motor cycle time per hour	Motors less 4.0 HP *(3 kW)* max. 200	
Ambient temperature	104 °F *(40 °C)*	
Set-up altitude	3280 ft *(1000 m)*	

ATTENTION

The pumps are to be operated within their design limits. Applications outside of these limits are not approved. The manufacturer is not responsible for any damages resulting from use of the pumps in such applications.

2.3 Technical data

Type	Max. del. pressure spec. weight 1 PSI	*bar*	Max. del. volume GPM	*l/min*	Height **H** **I**nches *mm*	Depth of immersion **h** Inches	*mm*	Weight lbs	*kg*	Power HP *kW*	Noise level [1] dBA / 60 Hz
TS12S 110	38	*2.6*	9.5	*38*	7.0	4.33	110	11.9	5.4	0.36	61
150					*178*	5.90	150	12.3	5.6	*0.27*	
190						7.48	190	12.8	5.8		
250						9.84	250	13.4	6.1		
300						11.81	300	14.3	6.5		
TS13S 110	52	*3.5*	12.5	*48*	8.3	4.33	110	13.9	6.3	0.54	61
150					*211*	5.90	150	14.3	6.5	*0.4*	
190						7.48	190	14.8	6.7		
250						9.84	250	15.4	7.0		
300						11.81	300	16.3	7.4		
TS15S 190	110	*7.8*	12.0	*42*	10.0	7.48	190	26.9	12.2	1.5	68
220					*255*	8.66	220	27.8	12.6	*1.1*	
TS21S 110	55	*3.8*	17.5	*68*	8.5	4.33	110	17.2	7.8	0.85	68
150					*217*	5.90	150	17.6	8.0	*0.63*	
190						7.48	190	18.1	8.2		
250						9.84	250	18.7	8.5		
300						11.81	300	19.6	8.9		
350						13.78	350	20.5	9.3		
TS22S 110	75	*5.1*	18	*70*	9.3	4.33	110	21.4	9.7	1.25	68
150					*235*	5.90	150	21.8	9.9	*0.92*	
190						7.48	190	22.3	10.1		
250						9.84	250	23.0	10.4		
300						11.81	300	23.8	10.8		
350						13.78	350	24.7	11.2		
TS24S 140	125	*8.8*	17	*62*	11.8	5.51	140	44	20	2.3	74
180					*300*	7.09	180	46	21	*1.7*	
220						8.66	220	49	22		

1) Noise emissions measured in accordance with DIN 45635 at a distance of 1 m

The motor is surface-cooled and compliant with DIN IEC 34 and EN 60034 (protection degree IP 55).

3 Safety instructions

When operating the pump, the safety instructions contained in this manual, the relevant national accident prevention regulations and any other service and safety instructions issued by the plant operator are to be observed.

3.1 Hazards in the event of non-compliance with the safety instructions

Non-compliance with the safety instructions may produce a risk to the personnel as well as to the environment and the machine and results in a loss of any right to claim damages.
For example, non-compliance may involve the following hazards:

- Failure of important functions of the machines/plant
- Failure of specified procedures of maintenance and repair
- Exposure of people to electrical, mechanical and chemical hazards
- Endangering the environment due to hazardous substances being released

3.2 Unauthorized modes of operation

- Pump may not be used in potentially explosive environments**!**
- Pump and discharge piping are not designed to hold any weight and may not be used as a step ladder.

3.3 Remaining Risk

Risk of Injury!
Risk of squeezing or crushing body parts when installing or removing the pump exists. Proper and secured lifting tools must be used.

Risk of burns!
The pump must have cooled down sufficiently prior to commencing any repair, maintenance or installation.

3.4 Qualification and training of operating personnel

The personnel responsible for operation, maintenance, inspection and assembly must be adequately qualified. Scope of responsibility and supervision of the personnel must be exactly defined by the plant operator. If the staff does not have the necessary knowledge, they must be trained and instructed, which may be performed by the machine manufacturer or supplier on behalf of the plant operator. Moreover, the plant operator is to make sure that the contents of the operating manual are fully understood by the personnel.

3.5 Safety instructions relevant for operation

- If hot or cold machine components involve hazards, they must be guarded against accidental contact.
- Guards for moving parts (e.g. coupling) must not be removed from the machine while in operation.
- Any leakage of hazardous (e.g. explosive, toxic, hot) fluids (e.g. from the shaft seal) must be drained away so as to prevent any risk to persons or the environment. Statutory regulations are to be complied with.
- Hazards resulting from electricity are to be prevented (see for example, the VDE Specifications and the bye-laws of the local power supply utilities).
- The pumps' stability against falling over is not ensured unless it is properly mounted onto the tank.
- The female threads on the motor MUST NOT be used to lift the entire pump and motor assembly.

3.6 Safety instructions relevant for maintenance, inspection and assembly work

Any work on the machine shall only be performed when it is at a standstill, it being imperative that the procedure for shutting down the machine described in this manual be followed.
Pumps and pump units which convey hazardous media must be decontaminated.
On completion of work all safety and protective facilities must be re-installed and made operative again.
Prior to restarting the machine, the instructions listed under "Start up" are to be observed.

3.7 Signs on the pump

It is imperative that signs affixed to the machine, e.g.:

- arrow indicating the direction of rotation
- symbols indicating fluid connections

be observed and kept legible.

3.8 Unauthorized alterations and production of spare parts

Any modification may be made to the machine only after consultation with the manufacturer. Using spare parts and accessories authorized by the manufacturer is in the interest of safety. Use of other parts may exempt the manufacturer from any liability.

4 Transportation and Storage

Protect the pump against damage when transporting.
The pumps may only be transported in a horizontal position and hooks or straps must be attached on the motor and pump end.
Do not use the pump shaft for connecting any transportation aids such as hooks or straps.
Pumps must be drained prior to their storage.
Store pump in dry and protected areas and protect it against penetration of foreign bodies.
Always store pump above the freezing point!

5 Installation and Connection

5.1 Mechanical installation

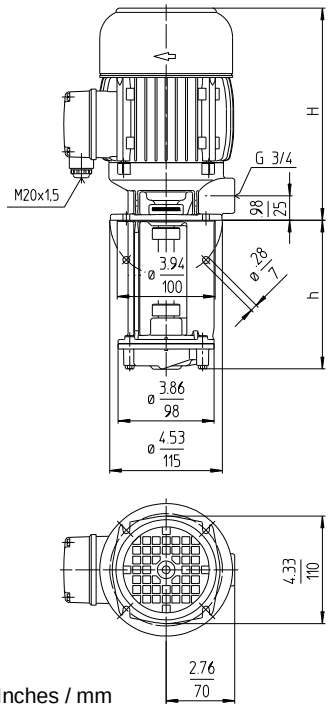
During any assembly or disassembly process the pumps must be secured against tipping trough ropes for example at all times.

Pumps must be mounted securely. Piping, tank and pumps must be mounted without any tension.

The inlet is at the bottom of the immersed pump body. The distance between the inlet and the tank bottom must be so large that the inlet can not be blocked by deposits during longer shutdowns.

To obtain the full flow rate it is recommended to choose for the pipework the nominal bore diameter of the pumps cross section for connection. Therefore pipe bends should be used, not pipe angles!

The pipework must be qualified for occuring hydraulic pressure.



Dimensions in Inches / mm

ATTENTION

Pay attention of the max. tightening torque for piping connection

Type	Pipe connection	Cast iron	Bronze
TS12, 13, 21, 22	G ¾	60 ft. lbs. *(80 Nm)*	30 ft. lbs. *(40 Nm)*
TS15, TS24	G ¾	60 ft. lbs. *(80 Nm)*	-

When installed the space around the pump must be large enough to provide sufficient cooling of the motor.

Do not prop up the pressure line via the joining socket.

The pump must be mounted in that way that rotating parts under the cover of the coolant tank can not be touched!

5.2 Electric wiring

All service work must be carried out by qualified service personnel. Pump must be disconnected from the power source and all rotating parts must stand still. Reassure that pump is disconnected from power source and cannot be switched on. Verify that there is no voltage at the terminal board!

According to the European Standard EN809 a motor overload must be installed and properly set to the full load amps stated on the pump name plate.

It is the responsibility of the machine operator to decide whether or not an additional emergency switch must be installed.

5.2.1 Circuit

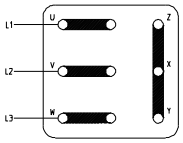
Tension voltage and frequency must correspond with the shown specification on the nameplate.

The pump must be wired so that a solid longterm electrical connection is ensured. Establish a solid ground connection.

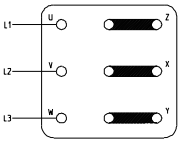
The electrical wiring must be performed according to the wiring diagram shown inside the terminal box cover. (Please see above sample wiring diagrams)

Wiring diagram e.g.

Voltage changing 1:2 YY / Y
e.g. 230 / 460 V, 60 Hz



YY
Low Voltage



Y
High Voltage

There may be no foreign objects such as dirt, particles or humidity inside the terminal board.

Mount terminal board cover to motor tight against dust and humidity and close up all unused wiring ports.

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When Variable Frequency Drives are used interfering signals might occur.

Non-sinus shaped supply voltage from a variable frequency drive might result in elevated motor temperatures.

6 Start-up / Shut-down

6.1 Start-up

ATTENTION

Switch off at the mains.
After connection the electrical wires, close the terminal box. Briefly start the motor (max. 30 sec.) and check the rotation according to the arrow on the top of the motor.
If the direction is incorrect change over two of the power leads.

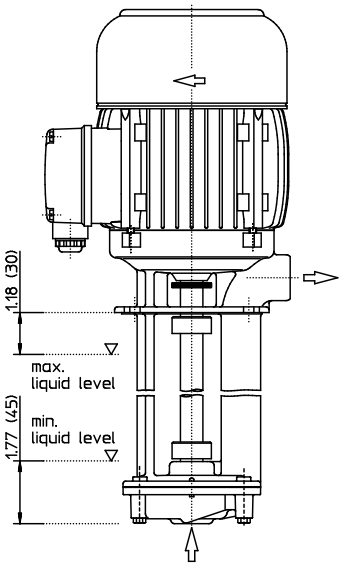
6.2 Shut-down

All service work must be carried out by qualified service personnel. Pump must be disconnected from the power source and all rotating parts must stand still. Reassure that pump is disconnected from power source and cannot be switched on. Verify that there is no voltage at the terminal board!
Open terminal box and disconnect the power leads.
Empty out the pump.

7 Operation

Liquid level

According to the drawing shown below, the maximum liquid level must stay about 1.18 Inches *(30 mm)* below the mounting flange, also ensure that the minimal liquid level for the TS pump is 1.77 Inches *(45 mm)* before starting up the motor.



Dimensions in Inches (mm)

If the pump should lock up and cease, shut pump down (see 6.2) and disconnect from power supply. Pump must be uninstalled and removed from the system prior to its repair.

8 Servicing and Maintenance

ATTENTION

The surface of the motor must be kept free of dirt.

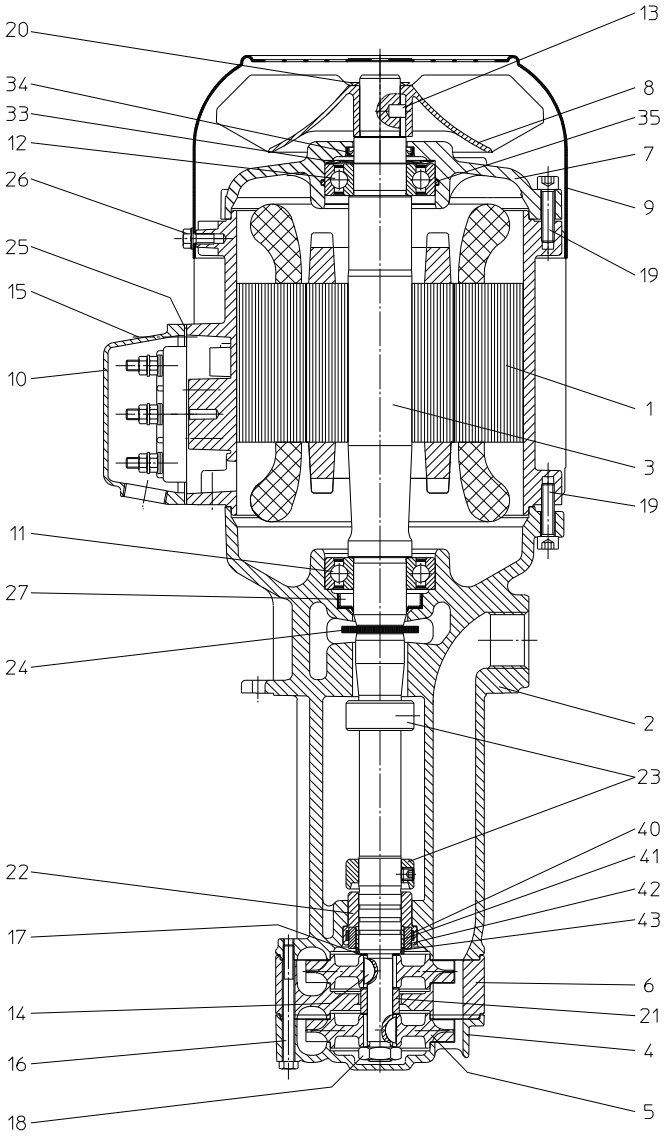
The motor shaft is spinning in permanently greased ball bearings (with special grease and increased bearing play) and does not require any special maintenance.

9 Troubleshooting Guide

Fault	Cause	Remedy
Motor does not start, no motor noise	At least two of the power supply leads have failed Overload has tripped	Check fuses, terminals and supply leads . Inspect overload
Motor does not start, humming noise	One of the supply leads has failed Impeller faulty Motor bearing faulty	See above Replace impeller Replace bearing
Overload trips	Pump locked up mechanically High on/of cycling frequency	Inspect pump hydraulics Check application
Power consumption is too high	Wrong direction of rotation of impeller Lime or other deposits mechanical friction	See above Clean pump mechanism repair pump
Motor overheats	High on/off cycling frequency Wrong power supply (voltage or cycles) Insufficient cooling	See above Power supply must correspond with name plate rating Check air flow at motor fan
Pump does not pump	liquid level too low Pump mechanism faulty Pipe blocked	Fill up liquid replace pump mechanism Clean pipe
Insufficient flow and pressure	Wrong direction of rotation of impeller Pump mechanism silted up Worn pump mechanism	Change over two power supply leads Clean pump mechanism Replace pump mechanism
Incorrect flow or pressure	Wrong power supply (voltage or cycles)	Power supply must correspond with name plate rating
Running noise/Vibration	Foreign objects in pump end Impeller damaged Bearing/Bushing broken	Remove foreign objects Replace impeller Replace bearing/bushing

10 Spare Parts

10.1 Spare Part List for the Immersion Pumps of the Series TS12 ... 24



Item	Description	
1	Stator with terminal board	
2	Pump body	
3	Shaft with rotor	
4	Inlet cover	
5	Impeller	
6	Pump plate TS15, TS24	
7	End shield TS13…TS24	
8	Fan	
9	Fan cover	
10	Terminal box	
11	Ball bearing	DIN 625
12	Ball bearing	DIN 625
13	Parallel pin TS15…24	DIN 7
14	Woodruff key	DIN 6888
15	Slotted cheese head screw	DIN 84
16	Hexagon head cap screw	DIN 933
17	Distance plate	
18	Hexagon nut	
19	Socket head cap screw TS12 and TS24	DIN 912
(19)	Stud bolt with bond TS13…TS22	
20	Retaining ring TS15…TS22	
20	Retaining ring TS24	DIN 471
21	Distance liner TS15, TS24	
22	Bearing bush	
23	Splash ring	
24	Splash ring	
25	Gasket	
26	Thread rolling screw TS24	DIN 7500
27	Shaft seal	
33	Compensation disk TS24	
34	Shaft seal TS24	
35	O-Ring TS24	
40	Tolerance ring TS12, 13, 21, 22 as special make	
41	Running sleeve TS12, 13, 21, 22 as special make	
42	Bearing busch TS12, 13, 21, 22 as special make	
43	Spacer ring TS12, 13, 21, 22 as special make	

10.2 Indications to the spare part order

Spare parts are available from the supplier.
Standard commercially available parts are to be purchased in accordance with the model type.
The ordering of spare parts should contain the following details:

1. **Pumptype**
   e.g. TS21S250
2. **Pump No.**
   e.g. 04156600
   The date of the construction year is a component of the pumps type number.
3. **Voltage, Frequency and Power**
   Take item 1, 2 and 3 from the nameplate
4. **Spare part with item No.**
   e.g. Impeller item No. 5

Tightening torques for screwed connections

Thread - ∅	M5		M6	M12
Strength classes	4.8	8.8	8.8	
Tightening torque ft. lbs. *(Nm)*	**1.5** ***(2)*** Item 19	**3.3** ***(4.5)***	**3.3** ***(4.5)***	**22** ***(30)***

11 Disposal

When disposing of the pump or the packaging materials the local and national regulation for proper disposal must be complied with.
Prior to its disposal, the pump must be completely drained and decontaminated if necessary.

12 WARRANTY

Brinkmann Pumps, Inc. warrants that the product contained herein conforms to the description in Brinkmann's catalog and that if this product shall fail to conform to the description thereof or to any express or implied warranty, Brinkmann shall, upon written notice of such nonconformity within one year of the date of its shipment from BRINKMANN'S plant, repair or replace such non-conforming material at the original point of delivery. Brinkmann will furnish instructions for disposition of the goods. If, however, Brinkmann provides a written warranty, as to this specific product, which is not in conformity to the above warranty, then as to such specific product, the specific written warranty shall prevail.

In addition to the warranty that this product will conform to the description in Brinkmann's catalog and that any such non-conforming material will be repaired or replaced, as above stated, BRINKMANN further warrants that it conveys good title to this product, free of all liens of any kind whatever unknown to the first Buyer. These are the sole warranties of BRINKMANN with respect to this product. BRINKMANN MAKES NO FURTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS ARE HEREBY DISCLAIMED BY BRINKMANN AND EXCLUDED FROM THIS SALE.

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